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Picking and Storing
Of Seed Corn under
Various Conditions

Agronomy

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PICKING AND STORING OF SEED CORN UNDER VARIOUS CONDITIONS

BY

G. C. JOHNSTONE

Thesis for the Degree of Bachelor of Science
in Agronomy

COLLEGE OF AGRICULTURE
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1905.

THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

G. C. JOHNSTONE

ENTITLED PICKING AND STORING OF SEED CORN UNDER VARIOUS

CONDITIONS.

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE

OF BACHELOR OF SCIENCE

Cyril G. Hopkins

HEAD OF DEPARTMENT OF AGRONOMY

THE VITALITY OF SEED CORN PICKED AT DIFFERENT DATES.

Conditions Which Suggested the Experiment.

It would be a great advantage to the farmer if he could select his seed corn before the crop has fully matured for the following reason: There is a great loss of seed corn every few years from freezing, the freezing injuring the vitality of the corn so much that it is unfit for planting. If the corn for seed could be selected earlier in the season, this difficulty would be obviated. It is questionable whether or not this early picking of seed corn is practicable, as corn which is selected very early is likely to be lower in germinating power than that which is much more matured. The object of this experiment is to gather evidence upon these facts.

Ten lots of corn were selected at intervals of one week apart, commencing the second day of September, Nineteen Hundred and Four. These lots were taken from a field of ordinary corn of the Leaming variety grown upon the farm of J. H. Percival. This farm is situated just south of the experimental farm near Champaign, Illinois. Each lot was composed of twenty five average sized ears. Each of the lots was weighed upon a Troemner ball scale immediately after being picked and a record was kept of the weight. It was then stored in a screen box to prevent the mice and rats from destroying any of the kernels. The box was about ten feet long, fifteen inches wide and six feet high. Shelves were built in this box in such a manner that two samples of corn could be accommodated upon each one, placed in a single layer. The front of this box consisted of four screen doors and the back was also entirely covered with



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screen. While this box was proof against rats and mice, the angoumois grain moth gave us a great deal of trouble and the samples had to be removed to a tight box built for the purpose and treated with carbon bisulphide. This operation had to be repeated several times. The first samples, which were less thoroughly cured and therefore softer, seemed to be infected by them, worse than any of the others. In selecting the kernels for germination, none of the ones infected by moths were taken, as it was not due to the time of picking or the storing that their vitality was affected. This box was placed in Room 206-1/2 a laboratory in the Agricultural Building. The temperature of the room was between 75 and 80 during the entire experiment. I think it was due to the light temperature of this room that the first three lots cured as thoroughly as they did. Very little mould appeared on them. This is very strange for they were just in the milk stage when picked.

Method of Moisture Determinations.

Rather than to make moisture determinations immediately after picking, it was more convenient to make tests for moisture after tests for germination had been made, as some of the ears must necessarily be destroyed to determine the moisture in them.

Each lot was weighed each week until its weight became constant. It was assumed that the difference in weight at the time of picking and the constant weight was due to a loss of moisture. This loss of weight plus the loss of weight by drying in an oven at 110 was assumed to equal the total amount of water in the sample when picked.

The following table shows the number of lots, dates of picking, weights when picked, weights at end of each week, and loss of weight each week:

Table 1.

Lot.	1.	2.	3.	4.	5.
No. of Ears.	25	25	25	25	25
Date Picked.	9/2	9/9	9/16	9/23	9/30
Wt. when picked.	22-12	28-8	27-6	30-5	27-1.75
Wt. end 1st week.	17-.25	21-14	22-8.62	26-5.25	23-12.25
Loss " " "	5-11.75	6-10	4-13.37	3-16.75	3-5.5
Wt. " 2nd "	10-10.25	18-8.12	19-14	23-2.5	21-1.5
Loss " " "	5-6	3-5.87	3-8.5	3-2.7	2-10.75
Wt. " 3rd "	8-11.37	16-13.25	16-8	20-14	18-15.5
Loss " " "	1-14.87	1-11.87	3-6	2-7.5	2-2
Wt. " 4th "	8-4.25	15-2	16-2	18-6.5	17-9.25
Loss " " "	-4.75	1-11.25	--6	2-7.5	1-6.25
Wt. " 5th "	7-15.5	13-11.62	14-14.75	16-14.75	17-3
Loss " " "	--1.25	1-6.38	1-3.95	--8.25	--6.25
Wt. " 6th "	7-14.25	13-4	14-4	16-8.5	17-1
Loss " " "	---	--7.62	--10.75	--5.75	--2
Wt. " 7th "	7-14.25	12-13.75	14-3	16-6	16-15.25
Loss " " "	---	--6.25	--1	--2.5	--1.75
Wt. " 8th "	7-10.75	12-13.5	14-2.25	16-5.25	16-14
Loss " " "	--3.5	---.25	---.75	---.75	--1.25
Wt. " 9th "	7-10.5	12-13	14-1.75	16-4.25	16-13
Loss " " "	---.25	---.5	---.5	--1	--1
Wt. " 10th "	7-10	12-13	14-1.5	16-3.25	16-12.5
Loss " " "	---.5	---	---.25	--1	---.5

Wt. end 11th week	7-10	12-12.5	12-1	15-3.25	16.10.75
Loss " " "	---	--.25	---	---	--.75
Wt " 12th "	---	12-12.25	12-1	---	10-10

Table 1 Continued.

Lot..	6	7	8	9	10
No. of Ears	25	25	25	25	25
Date Picked.	10/7	10/14	10/21	10/28	11.4
Wt. when Picked.	28-1.25	28-3	23-12	22-7.25	26-13
Wt. end 1st week	24-6.25	25-8.65	20-2.75	19-15.25	24-9
Loss " " "	3-10.75	2-10.35	3-9.25	2-8	2-.4
Wt. " 2nd "	21-8.55	23-8.25	18-14	18-13.5	22-8.75
Loss " " "	2-13.95	2-.4	1-4.75	1-1.75	2-.25
Wt. " 3rd "	19-10.5	21--	18-4.25	17-15	22-2.5
Loss " " "	1-14.05	2-8.25	--9.75	--14.5	--6.25
Wt. " 4th "	18-13.5	20-9.25	17-10.5	17-12	22-12
Loss " " "	--13	--6.25	--9.75	--3	--1.5
Wt. " 5th "	18-8.25	19-15.75	17-9	17-10.75	21-9
Loss " " "	--4.25	--9.5	--1.5	--1.25	--8
Wt. " 6th "	18-.75	19-14.25	17-8.5	17-8.5	21-5.75
Loss " " "	--7.5	--1.5	--.5	--2.25	--4.75
Wt. " 7th "	18-.5	19-13.75	17-7.75	17-7.5	21-5.5
Loss " " "	--.25	--.5	--.75	--1.	--.25
Wt. " 8th "	18-.5	19-12.75	17-5.5	17-7.25	21-2
Loss " " "	---	--1	--2	--.25	--3.5
Wt. " 9th "	18--	;9-10.75	17-5.5	17-5	20-15.6
Loss " " "	--.5	--2	---	--2.25	--2.4
Wt. " 10th "	17-14.75	19-10.75	17-3.1	17-2.75	13-2
Loss " " "	--1.25	---	--2.4	--2.25	--.25

Wt. end 11th week	17-14	19-8.75	17-2	17-2.5	13-1.5
Loss " " "	---	---.25	---.25	---	---
Wt. " 12th "	17-14	19-8.5	17-1.75		

Moisture determinations of each lot were made when the different lots became constant in weight. Five average ears were selected from each lot, these ears were shelled and the kernels thoroughly mixed and then ground very fine in a small mill in the soil fertility laboratory. The cobs were cut up first and then also ground as fine as possible. The ground corn and cobs were preserved in air tight jars until weighed out for the determination proper. Crucibles were heated so that all the moisture was driven off and then were allowed to cool in desicators. Next, the crucibles were weighed and exactly two grams of the ground corn and ground cobs weighed out. The moisture determinations of the grain and cobs were made separately. The crucibles and their contents were then put into an oven which remained at a temperature of 110°C. for five hours. Then they were removed from the oven to the desicator, allowed to cool, weighed and the percent of moisture determined by dividing the loss of weight by the amount of substance taken.

Knowing the percent of moisture of one lot when constant and knowing the loss of weight since picking due to air-drying, the moisture which the lot contained when taken from the field was determined according to the computations which follow:

COMPUTATION ILLUSTRATING THE METHOD BY WHICH THE PERCENT OF DRY MATTER IN THE SEVERAL LOTS WAS DETERMINED.

Weight when picked	22 lbs. 12 oz.	-	22.75 lbs.
Weight after becoming constant	7 " 10 "		7.625 "
Loss of weight due to evaporation	15 " 2 "		15.125 "

1 per cent of constant weight	.07625 lbs.
Percent of moisture when constant as determined by drying	1.26
Pounds water when constant	.07625 x 1.26 - .096
Pounds water when picked	.096 & 15.125 - 15.221
Percent water when picked	15.221 div.22.75 - .669 or 66.9 per cent.
Dry matter when picked	40.1%

. GERMINATING TESTS.

Germination tests were made when the different lots ceased to lose weight. These tests were made by taking four kernels from each ear. The ear was taken in the left hand, a knife in the right. One kernel was taken 2" from the butt, the ear was then turned one-fourth of the way around and 2" nearer the tip another kernel was taken out. This operation was continued until four kernels had been selected from the ear. The ears were arranged in order and each set of kernels from one ear was put into a plate of damp sand, tips down and very close together. The set of kernels from the next ear were placed in the same relation to the first set in the sand, as the second ear bore to the position of the first one upon the shelf, upon which they were arranged. This same method was followed until all the sets of kernels were placed in the plates of sand. These plates were then placed in the germinating room. This is a small room in which the temperature was kept as near constant as possible. It was attempted to keep the room as near 79 F. as possible, as this is considered the best temperature for the germination of corn, but as a matter of fact the temperature stood about 85 F. during the entire period of germination. The third day these plates were

taken out of the germinator and examined, and the ones which had sprouted were taken out and recorded. The kernels which had not sprouted were left until the fifth day and then examined again. If they had not started to grow, they were discarded and recorded as worthless. If one of a set of kernels did not germinate, the ear from which it came was tabulated as "bad", and unfit for planting. (See table 2)

Table 2.

TABLE SHOWING DETERMINATION OF GERMINATION TESTS.

Lot 1 65%.

Ear No.	Date Planted	Date Counted	No. Kernels Germ
1	12/10	12/14	3
2	"	"	2
3	"	"	1
4	"	"	4
5	"	"	5
6	"	"	6
7	"	"	4
8	"	"	3
9	"	"	3
10	"	"	4
11	"	"	1
12	"	"	4
13	"	"	1
14	"	"	4
15	"	"	4
16	"	"	1
17	"	"	1

Ear No.	Date Planted.	Date Counted.	No. Kernels Germ
18	12/10	12/14	2
19	"	"	4
20	"	"	0
21	"	"	3
22	"	"	0
23	"	"	4
24	"	"	3
25	"	"	3

Lot. 2 92%

1	12/12	12/16	4
2	"	"	4
3	"	"	4
4	"	"	4
5	"	"	4
6	"	"	4
7	"	"	4
8	"	"	4
9	"	"	4
10	"	"	3
11	"	"	3
12	"	"	3
13	"	"	4
14	"	"	3
15	"	"	4
16	"	"	3
17	"	"	4

Lot.2 92% -Contd-

Ear No.	Date Planted	Date Counted.	No. Kernels Germ.
18	12/12	12/16	4
19	"	"	3
20	"	"	4
21	"	"	4
22	"	"	4
23	"	"	4
24	"	"	4

Note: By mistake, lot #2 only consisted of twenty-four ears throughout the experiment.

Lot 3 93 %.

1	12/13	12/17	4
2	"	"	4
3	"	"	4
4	"	"	0
5	"	"	4
6	"	"	4
7	"	"	4
8	"	"	4
9	"	"	4
10	"	"	1
11	"	"	4
12	"	"	4
13	"	"	4
14	"	"	3
15	"	"	3
16	"	"	4

Lot 3 Contd.

Ear No.	Date Planted	Dated Counted.	No. kernels germ.
17	12/13	12/17	4
18	"	"	4
19	"	"	4
20	"	"	3
21	"	"	4
22	"	"	4
23	"	"	4
24	"	"	4
25	"	"	3
26	"	"	4

Note: Lot 3 consisted of twenty-six ears throughout the experiment owing to a mistake when taken.

Lot 4 99-1/10 %

1	1/17	1/20	4
2	"	"	4
3	"	"	4
4	"	"	4
5	"	"	4
6	"	"	4
7	"	"	4
8	"	"	4
9	"	"	4
10	"	"	3
11	"	"	4
12	"	"	4
13	"	"	4

Lot 4 Contd.

Ear No.	Date Planted.	Date Counted	No Kernels Germ.
14	1/17	1/20	4
15	"	"	4
16	"	"	4
17	"	"	4
18	"	"	4
19	"	"	4
20	"	"	4
21	"	"	4
22	"	"	4
23	"	"	4
24	"	"	4
25	"	"	4

Lot 5 95 %

Ear No.	Date Planted.	Date Count ed.	No Kernels Germ.
1	1/17	1/20	4
2	"	"	4
3	"	"	1
4	"	"	4
5	"	"	4
6	"	"	4
7	"	"	4
8	"	"	4
9	"	"	4
10	"	"	4
11	"	"	4
12	"	"	4

Lot 5 Contd.

Ear No.	Date Planted.	Date Counted.	No Kernels Germ.
13	1/17	1/20	4
14	"	"	4
15	"	"	4
16	"	"	4
17	"	"	4
18	"	"	4
19	"	"	4
20	"	"	4
21	"	"	2
22	"	"	4
23	"	"	4
24	"	"	4
25	"	"	4

Lot 6 100 %

Ear No.	Date Planted	Date Counted	No. Kernels Germ.
1	1/19	1/22	4
2	"	"	4
3	"	"	4
4	"	"	4
5	"	"	4
6	"	"	4
7	"	"	4
8	"	"	4
9	"	"	4
10	"	"	4
11	"	"	4

Lot 6 Contd.

Ear No.	Date Planted.	Date Counted.	No. Kernels Germ.
12	1/19	1/22	4
13	"	"	4
14	"	"	4
15	"	"	4
16	"	"	4
17	"	"	4
18	"	"	4
19	"	"	4
20	"	"	4
21	"	"	4
22	"	"	4
23	"	"	4
24	"	"	4
25	"	"	4

Lot 7 100 %

1	"	"	4
2	"	"	4
3	"	"	4
4	"	"	4
5	"	"	4
6	"	"	4
7	"	"	4
8	"	"	4
9	"	"	4
10	"	"	4
11	"	"	4

Lot 7 Contd.

-14-

Ear No.	Date Planted	Date Counted.	No. Kernels Germ.
12	1/19	1/22	4
13	"	"	4
14	"	"	4
15	"	"	4
16	"	"	4
17	"	"	4
18	"	"	4
19	"	"	4
20	"	"	4
21	"	"	4
22	"	"	4
23	"	"	4
24	"	"	4
25	"	"	4

Lot 8 98 %.

1	1/20	1/24	4
2	"	"	4
3	"	"	2
4	"	"	4
5	"	"	4
6	"	"	4
7	"	"	3
8	"	"	4
9	"	"	4
10	"	"	4
11	"	"	4
12	"	"	4

Lot 8 Contd.

Ear No.	Date Planted.	Date Counted.	No. Kernels Germ.
13	1/20	1/24	4
14	"	"	4
15	"	"	4
16	"	"	4
17	"	"	4
18	"	"	4
19	"	"	4
20	"	"	4
21	"	"	4
22	"	"	4
23	"	"	4
24	"	"	4
25	"	"	4

Lot 9 99 %

1	1/20	1/24	4
2	"	"	4
3	"	"	4
4	"	"	4
5	"	"	4
6	"	"	4
7	"	"	4
8	"	"	4
9	"	"	4
10	"	"	4
11	"	"	4
12	"	"	4

Lot 9 Contd.

Ear No.	Date Planted.	Date Counted.	No. Kernels Germ
13	1/20	1/24	4
14	"	"	4
15	"	"	4
16	"	"	4
17	"	"	4
18	"	"	3
19	"	"	4
20	"	"	4
21	"	"	4
22	"	"	4
23	"	"	4
24	"	"	4
25	"	"	4

Lot 10 98 %.

1	1/21	1/26	4
2	"	"	4
3	"	"	4
4	"	"	4
5	"	"	3
6	"	"	4
7	"	"	4
8	"	"	4
9	"	"	4
10	"	"	4
11	"	"	4
12	"	"	4

Lot 10 Contd.

Ear No.	Date Planted.	Date Counted.	No. Kernels Germ.
13	1/21	1/26	4
14	"	"	4
15	"	"	4
16	"	"	4
17	"	"	4
18	"	"	4
19	"	"	4
20	"	"	4
21	"	"	4
22	"	"	4
23	"	"	3
24	"	"	4
25	"	"	4

Table 3.

The following table is a summary of the results of table No. 1 and 2.

Lot.	1	2	3	4	5
Date	9/2	9/9	9/16	9/23	9/30
No. Ears	25	24	26	25	25
Wt. when Picked	22-12	28-8	27-6	30-5	27-1.75
Constant Weight	7-10	12-12	14-1	15-4	16-9
Loss of Wt.	15-2	15-12	13-5	15-1	10-8.75
% Moisture when pkd	66.9	55.72	48.73	50.19	39.08
% " "					
constant	1.26	1.05	.91	1	1.15
Total no. bad ears	13	5	6	1	2
% Germination.	65	91	93	99.1	95

Table 3 Continued.

Lot.	6	7	8	9	10
Date	10/7	10/14	10/21	10/28	11/4
No. Ears	25	25	25	25	25
Wt. when picked	28-1.25	28-3	23-12	22-7.25	26-13
Constant Weight	17-11	19-2.5	17-1	17-2.5	20-2.4
Loss of Wt.	11-6.25	9-.5	6-11	5-4.75	6-10.6
% Moisture when pkd	38.28	32.1	30.74	20.29	25.93
% " "					
constant	1.68	1.35	1.84	1.53	1.50
Total no. bad ears	0	0	2	1	2
% Germination	100	100	98	99	98

Note. In columns headed "Weight when Picked", constant weight and loss of weight, the first number indicates the number of pounds, the second number, ounces.

Table 3 contains a summary of the whole experiment. This table shows the percent of germination of lot 1, is very low and that is entirely impracticable to pick seed corn as immature as this lot was picked. When the lot became constant in weight, the kernels were very shriveled and looked as if none of them would ever germinate. Lots 2 and 3 were also very low in germination and it would be impracticable to select seeds of such low vitality as these were found to have. Lots 4 to 10 show a very uniform percentage of germination with the exception of lot 5 which is slightly lower than the other. But I do not think that this was due to the time of picking.

Another thing which table 3 shows is the importance of germinating each ear rather than making a composite test of a lot of corn. In lots 8 and 10 for instance the per cent of germination is 98 % while there are two ears which should be really thrown out, as they might plant several hills that would not grow at all. In this way the stand of corn would be greatly injured in the field. If each ear is designated in the manner mentioned above the work of germinating will be paid for several times over by the increased yield of the crop. According to the table, seed corn can be selected without injuring the germinating power after the 1st of October. Of course this cannot be decided definitely by one experiment, but if this were true, it would be a great advantage to the farmer as stated in the beginning of this article. He could always be sure to get his seed selected before the freezing weather in the Fall. Then the corn for seed could be selected before corn husking time, this would enable the farmer to see what sort of a stock the ear grew upon. A good ear of corn may grow upon a poor stalk as it may have received its size from some distant ancestor which character had

been latent until this generation. If a good ear grows upon a poor stalk, it should not be selected for seed because of the principle that "like produces like" and for this same reason a good ear upon a strong healthy stalk is very desirable for seed purposes.

Literature.

From Wisconsin Experiment Station Report for 1900.

The only literature which I could find upon this subject, was an experiment which was carried on by the Wisconsin Experiment Station. They selected corn for seed at different times beginning the last of August and continuing until the corn was fully matured. They repeated this practice for five successive years and planted each of these lots the succeeding year for test in yield. They concluded from their experiments that the corn which was selected when it was very immature gave the lowest yields for five years. The slightly immature corn giving the largest yields while the fully matured seed corn gave a yield mid-way between the other two. The writer spoke of this as being in accordance with the idea which some farmer had in selecting their seed corn before it was fully matured.

Conclusion.

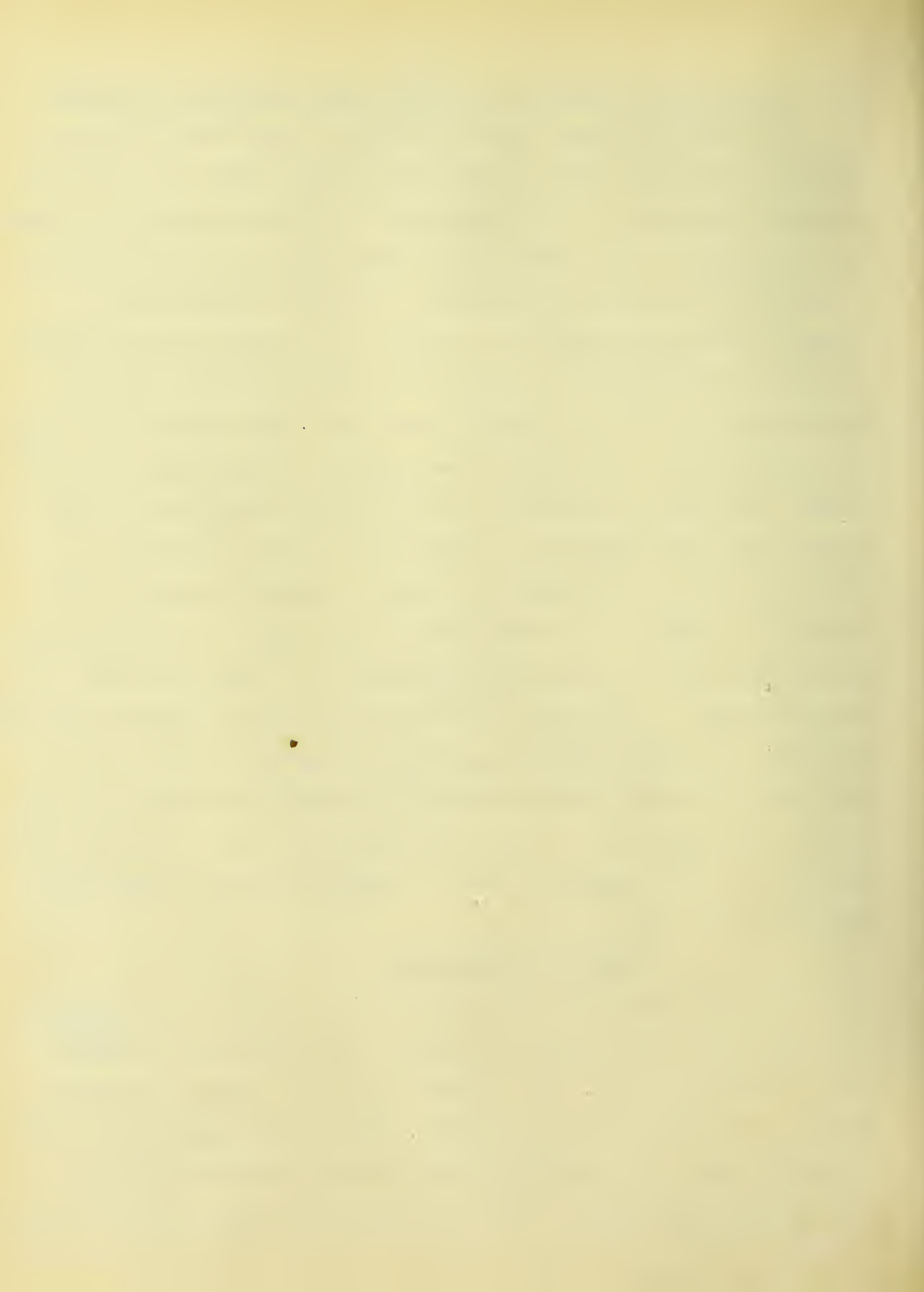
The results of the experiment would indicate that seed corn may be taken safely after the first week of October and not injure the vitality.

THE VITALITY OF SEED CORN STORED UNDER DIFFERENT CONDITIONS.

Of late years many complaints have been made about the poor stands of corn and I have noticed this more the last two years as I have been interested to find the cause. I believe these poor stands are due partly to poor seeds and for this reason the investigations I am about to describe were started. The low vitality may be caused by different methods of storing, for instance corn stored for seed in a crib might not be as good as seeds stored in a dry house of some sort, or seed corn kept in one store house may be of stronger vitality than the same kind of seed stored in another kind of store house. The places selected for storing the different lots of corn used in this experiment were as near the different conditions to which seed corn is subjected according to farm experience as it was possible to make it. For the last two years many of the farmers in this locality were compelled to buy seed corn because their own would not grow. This goes to show that some better method of storing seed corn should be resorted to, and the old method of storing corn for seed in the crib from the time it is picked until planting time must be done away with. Upon this high priced land it is necessary that as nearly as possible a perfect stand be secured in order that the investment pay.

OBJECT OF EXPERIMENT.

It was attempted to store the different lots of corn used in this experiment under as many different conditions as are usually met with upon the farm. For instance air dried corn was compared with to fire dried corn for vitality. Then it was endeavored to find the effect upon the vitality of the ordinary atmosphere to which corn is subjected, after it was fire dried and after it was air dried.



The different places of storing which were decided upon were not as marked in regard to the object for which they were selected as was desired, but were the best that could be found. However, we tried to discover whether the slight difference of the places of storage made any difference in the vitality of the ten lots.

DESCRIPTION OF THE LOTS OF CORN USED.

The corn used was selected from an ordinary field of yellow ~~av~~ leaming corn upon the farm of Mr. J. H. Percival, situated just south of the experimental farm near Champaign, Illinois. Upon the ninth of November Nineteen Hundred Four. The corn was put into bushel crates made of pine lumber one half inch thick by about four inches wide. The crates were about two feet long by twelve inches wide and the slats were just wide enough apart to prevent an ear from going through. The lots were put in these sort of boxes because they would be easy to handle and plenty of air could circulate through the corn. Each of the lots consisted of one bushel of corn. Lot 1 was stored in the germinating room, which is a small room used for germinating corn. It is situated just off the corn-judging laboratory in the Agricultural Building. It remained at a temperature of 85 F. throughout the entire experiment. This lot was left in the germinating room from the time it was picked until the experiment was finished. It was supposed to represent the condition of a dry house in which corn might be stored for the winter.

Lot 2 was stored upon a swinging platform, called the "deck", in a closed, poorly ventilated building called the "Ware-house". It was supposed to represent a cold dry place where there was no current of air. Corn intended for seed is stored many times in just such places upon the farm. It was left here until the experiment was

completed.

Lot 3 was stored first in the germinating room until it ceased to lose weight and then it was changed to the deck of the ware house mentioned above. This was done to determine whether or not a still, cold, dry atmosphere, affects the vitality of the corn after it has been thoroughly fire dried. A check was left in No. 1 in the germinating room.

Lot 4 was stored in the open air under a crib roof over a drive way, so that it was exposed to a free circulation of air, until it ceased to lose weight. It was then moved to the deck of the ware house. This had in view the effect in regard to the vitality, of leaving the corn exposed to the cold with a good circulation of air and then putting it in a still, dry, cold place for the rest of the time of the experiment. This compared the two methods of air drying and fire drying corn before storing it in an unventilated crib.

Lot 5 was stored in the germinating room and dried, until it became constant in weight, then it was removed to the cellar of the ware house which is a very damp, cold place. The object of this was to see whether or not corn which is thoroughly fire dried will be injured in vitality by storing in a place which is very cold and damp and having no circulation of air. Almost any cellar which is not heated will represent this place upon the farm.

Lot 6 was stored in the open air under the crib roof mentioned above in lot 4. It was moved to the cellar of the ware house when it became constant in weight. The object in this was to see the effect the atmosphere of the cellar of the ware house described in Lot 5 had upon the lot stored in the open air as compared with its

affect upon the lot stored in the germinating room which was thoroughly dried by artificial heat.

Lot 7 was stored in the germinating room until it stopped losing weight when it was hung in the cellar of the Agricultural Building which is a damp, moist place without any circulation of air. This was done to determine whether or not a humid atmosphere will injure the vitality of seed corn after it is thoroughly dried by artificial heat providing it does not freeze. This condition might be met with in a warm climate where seed corn was stored in an unfinished cellar.

Lot 8 was stored in the open air under the crib roof as in lot 4 until constant in weight and then was taken to the cellar of the Agricultural Building for the purpose of making a comparison of air dried corn and fire dried corn in the same atmosphere as mentioned in lot 7.

Lot 9 was stored in the germinating room until it ceased losing weight and then was stored in an open crib and covered with other corn so that it would be under the conditions of corn stored in open cribs as nearly as possible. This is a very practical point which is very much discussed at present as to whether or not corn can be fire dried and then put into an open crib.

Lot 10 was stored under the same crib roof mentioned in Lot 4 until constant and then was put into an open crib and covered with other corn as Lot 9. The purpose of comparing Lots 9 and 10 in regard to vitality was to discover whether the air dried or the fire dried was affected most upon being exposed to the atmosphere of an open crib. The practical problem confronting the farmer is whether fire dried corn or air dried corn will retain its vitality best

lots contained at these two times could be determined. The following computation illustrates the method of determining moisture when the lots are constant and at the end of the experiment:

METHOD OF DETERMINING MOISTURE WHEN LOTS WERE CONSTANT AND
AT THE END OF THE EXPERIMENT.

Lot 1.

Weight of lot when picked	91.5 lbs
Weight of lot 1 when constant	78 "
Loss in weight of lot 1	13.5 "
One per cent of weight when picked	.915 "
Percent of moisture in lot 1 when picked	17.45 "
Weight in moisture in lot 1 when picked $.915 \times 17.45$	- 15.96 "
Weight in moisture in lot 1 when constant $15.96 - 13.5$	-- 2.46 "
Percent in moisture in lot 1 when constant $2.46 \div 91.5$	- .0629"
	or 2.69 %
Percent dry matter in lot 1 when constant	97.31

Table 1.

The following table shows weekly weight and losses of the different lots and also the weights of the different lots at the end of the experiment:

Date of Weighing	Lot. 1.	Lot 2.	Lot 3.	Lot 4.	Lot 5.
November 9th	91.5 lbs	94.5 lbs	98.5 lbs	99.5 lbs	96 lbs
November 17th	87.5	91.75	94.75	97	93
November 25th	85.5	89.5	90.75	93.5	89
December 1st	83	88	89.5	90.5	87.
December 8th	78.5	89	83	92	80.5
December 15th	78	89	82	91.5	79.5
December 22nd	78.5	88.5	81	91.5	78.25
December 29th	78.5	88.5	79.5	92.5	76.5
January 5th	78	89	79	92.5	76

Crates moved January 12, 1905.

Weight of crates at the end of experiment.

April 6th	78	85	84	88.5	83
Date of Weighing	Lot 6	Lot 7	Lot 8	Lot 9	Lot 10
November 9th	95.	97.25	86.25	89.	99
November 17th	92.5	93.5	82.75	85.5	96
November 25th	90	90	81	83	94
December 1st	88	88	78.5	80.75	91.5
December 8th	88	82	78.5	75.5	91.5
December 15th	88.75	81.75	79	74	91.25
December 22nd	89	80	79	73	91.5
December 29th	89.75	79	80.5	72	91.75
January 5th	89.25	78.5	79.75	71.5	91.25

Crates moved January 12th, 1905.

Weight of crates at the end of experiment.

	Lot 6	Lot 7	Lot 8	Lot 9	Lot 10
April 6th	89.5	82.5	74	77	87.5

GERMINATION TESTS.

About the usual time for testing seed corn for planting the different lots were germinated to test their vitality. Each ear of every lot was tested. The ears of all the lots were laid in order upon tops of long desks and then each ear was taken up in one hand and with a knife in the other four kernels were taken out. The first one just about two inches from the butt, the ear was then turned one fourth around and two inches toward the tip a kernel was taken out. The ear was turned one fourth around again and two inches farther down toward the tip another kernel was taken out. This operation was continued until four kernels were selected from the ear. These kernels were supposed to represent the ear in vitality. Each set of kernels was put into a plate of damp sand with tips downward and arranged in the same successive manner as the ears upon the desk. A slip of paper with the number of the ear upon it was placed where the first ear began, in a plate. Another with the number of the ear which was planted last in the plate. These plates were then placed in the germinating room which is a small room built purposely for the germinating of seed corn. It is connected with the corn judging laboratory in the Agricultural Building. It is the intention to keep this room at about 79 F. as this is the best temperature for the germination of corn. The fact of the case is however that the temperature was about 85 F. during the entire time of germination. After four days the kernels were counted and recorded. If any kernel from one ear did not germinate that ear was discarded as it was unfit for planting.

RESULTS OF GERMINATION TESTS.

The following results were obtained from the germination tests

of the bushel lots of corn used in this experiment. The number of ears in the lot was recorded and the ones which germinated 100 % were not noted. Just the ones which failed to germinate were accounted for.

Lot 1 -- 69 ears.

Ear 61 3 kernels germinated

All others 100 %.

Percent germination of sample 99.6

Lot 2 -- 77 ears. --

Ear 53 3 kernels germinated. Percent germination 99.5 %

All others 100 %.

Lot 3 -- 83 ears.

Ear 64 3 kernels germinated Percent germination 99.6%

Ear 78 3 kernels germinated.

Lot 4 -- 82 ears.

Ear 71 3 kernels germinated.

Ear 74 3 kernels germinated

Ear 77 1 kernel germinated

Percent germination 98.3

Lot 5 -- 76 ears.

Ear 3 2 kernels germinated

Ear 22 2 kernels germinated

Ear 31 3 kernels germinated

Percent germination 98.3

Lot 6 -- 78 ears.

Ear 46 2 kernels germinated

Percent germination 99.3

Lot 7 -- 81 ears

Ear 35 3 kernels germinated.

Ear 58 3 kernels germinated.

Ear 80 1 kernel germinated.

Percent germination 98.4.

Lot 8 -- 67 ears.

Ear 6 3 kernels germinated.

Ear 27 2 kernels germinated.

Ear 49 3 kernels germinated.

Ear 50 2 kernels germinated.

Percent germination 97.7.

Lot 9 -- 67 ears.

Ear 11 No kernels germinated.

Ear 20 3 kernels germinated.

Ear 26 3 kernels germinated.

Ear 60 2 kernels germinated.

Percent germination 97.

Lot 10 -- 81 ears.

Ear 7 2 kernels germinated.

Ear 22 3 kernels germinated.

Ear 55 3 kernels germinated.

Ear 72 3 kernels germinated.

Percent germination 97.8.

AIR DRIED vs. FIRE DRIED CORN IN REGARD TO GERMINATION.

All the different lots were stored with the idea in mind that the lots one, three, five, seven and nine be fire dried and that the lot two, four, six, eight and ten be air dried and then a sample of each of these methods of drying be put under the same conditions in the second period of storage to determine which of the two methods preserved the vitality of the corn most, but the average per cent of germination showed no difference in the two methods. The following table compares the result of germination tests of the fire dried and of the air dried lots.

Table 1.

The following table shows air dried vs. fire dried corn in germination tests:

Lot No.	Manner Stored	Percent Germination	
		Fire Dried	Air Dried.
1	Germinating room	99.6	
2	Deck of Ware house		99.5 %
3	Germinating room and Deck in Ware house.	99.6	
4	Open air and deck in ware house		8.3
5	Germinating room and cellar of ware house	98.3	
6	Open air and cellar of Ware house.		99.3
7	Germinating room and cellar Agricultural Bldg.	98.4	
8	Open air and cellar of Agricultural Bldg.		97.7
9	Germinating room and ordinary corn crib	97	
10	Open air and ordinary corn crib		97.8
	Average	98.5	98.5

Table 2.

The following table is a summary of the contents of Table 1 of the percents of moisture and of the germination tests.

	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
Date picked	11/9	11/9	11/9	11/9	11/9
No. Ears	69	77	83	82	76
Wt. when picked	91.5 lbs	94.5 lbs	98.5 lbs	99.5 lbs	96 lbs
Wt. when moved	.. lbs	89 lbs	79 lbs	92 lbs	76 lbs
Wt. at end of exp.	78 lbs	85. lbs	84 lbs	88.5 lbs	83 lbs
% Moisture when pkd	17.45	17.45	17.45	17.45	17.45
% " " moved	..	12.1	..	9.91	..
% " at end of exp	2.69	5.06	2.73	6.39	4.01
No. "bad" ears	1	1	2	3	3
% Germination	99.6	99.5	99.6	98.3	98.3

Table 2 Contd.

	Lot 6	Lot 7	Lot 8	Lot 9	Lot 10
Date picked	11/9	11/9	11/9	11/9	11/9
No. Ears	78	81	67	67	81
Wt. When picked	95 lbs	97.25	86.25	89	99
Wt. when moved	89.25 lbs	78.5 lbs	79.75	71.5	91.25
Wt. at end of exp.	89.5 lbs	82.5	74	77	87.5
% Moisture when pkd	17.45	17.45	17.45	17.45	17.45
% " " moved	11.13	..	9.91	..	9.62
% " at end of exp	11.92	2.28	3.24	4.09	5.83
No. "bad" ears	1.	3	4	4	6
% Germination	99.3	98.4	97.7	97	97.8

From table 2 it will be seen that the per cent of germination of the different lots were so near alike that no definite conclusion

as to which was the best method of storing seed corn could be drawn. If the percent of ears which should be planted were being determined, lot 4, 5, 7, 8, 9 and 10 would be quite low, but as there was perhaps only kernel from each ear that did not germinate, one could not say that it was due to storing. There was a discrepancy in table 2 of the lots 3, 5, 7, and 9 which were taken just before they were moved to the second place of storing. The loss of weight due to the evaporation of moisture was greater than the total percent of moisture when the sample was picked. I think this was caused by the shelling of the corn in the crates when they were being handled each week in weighing. The corn became so dry that it shelled very badly. Upon first thought, one would say that all the increase of weight at the end of the experiment was due to the storing, but when investigated it seems as though it was due to the above reasons.

It does not seem necessary from this experiment to fire dry seed corn provided it is thoroughly air dried before freezing weather begins. No weather condition affect the germination if the corn is thoroughly dried and water does not come in contact with it. The table would indicate that one of the best methods of having seed corn is to select it before time for heavy freezes in the Fall, dry it by artificial means or by the free circulation of air. Then store it in a dry place until Spring, when each ear to be germinated and those ears which have one kernel which will not germinate should be discarded.

Another method which I think would be practicable if one were in the seed corn business and intended to store more corn than enough for his own use, would be to have a building in which he

could put two or three hundred bushels at once. These could be dried by artificial heat and then stored in a dry place and another lot of newly picked corn could be put into the dry house.

CONCLUSION.

From my results, I conclude that any ordinary method of storing seed corn whereby it is thoroughly cured before being subjected to the ordinary changes of temperature will be successful in maintaining the vitality of the corn.





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